

**Appendix B:** Physical, Biological and Chemical Data Reports (including weather info)

The data reports in Appendix B detail the following parameters:

- Reach Level Assessment
- Channel Modification
- Impacted Buffer
- Stream Crossing---*none identified/not included*
- Trash and Debris
- Utility Impacts
- Storm Water Outfalls
- Erosion
- Miscellaneous
- Biological and Chemical Data
- Site Sketch
- Weather Reports

Chemical & Biological Parameters Definitions<sup>1</sup>:

- **Biochemical Oxygen Demand – 5 days (BOD<sub>5</sub>):** “BOD<sub>5</sub> is a measure of the amount of oxygen used by aerobic (oxygen-consuming) bacteria as they break down organic wastes over five days.” **Dissolved Oxygen (DO):** DO is the amount of available oxygen (O<sub>2</sub>) in the water.
- ***E. coli*:** “While not all strains of *E. coli* are pathogenic themselves, they occur with other intestinal tract pathogens that may be dangerous to human health. We test for *E. coli* as an indicator of fecal contamination.”
- **Nitrate:** “Nitrogen occurs in water as nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), and ammonia (NH<sub>4</sub>). It enters the water from human and animal waste, decomposing organic matter, and runoff of fertilizer from lawns and crops.”
- **Orthophosphate:** “Orthophosphates are one form of phosphates. Orthophosphates are dissolved in the water (mostly inorganic) and are readily available for plant uptake. Thus, the orthophosphate concentration is useful as an indicator of *current* potential for algae blooms and eutrophication.”
- **pH:** pH is measure of the hydrogen ion concentration in the water. pH fluctuates by natural processes and by humans, and affects the aquatic organisms during reproduction.
- **Pollution Tolerance Index (PTI):** This is the Hoosier Riverwatch biological rating system based on macroninvertebrate sampling. The PTI score is indicative of the overall health of the stream over time. Refer to the Biological Monitoring field sheet for the framework of the scoring system.
- **Turbidity:** “Turbidity is the relative clarity of the water and is measured by shining a light through the water column. Turbid water is cloudier, and is caused by suspended matter including clay, silt, organic and inorganic matter, and algae.”

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<sup>1</sup> Volunteer Stream Monitoring Training Manual, Hoosier Riverwatch. March 2004. Indiana Department of Natural Resources, Division of Fish and Wildlife. Available at: <http://www.in.gov/dnr/riverwatch/>.



# Biological and Chemical Data Summary

<b>Sinking Creek</b>	PTI Rating*	Dissolved Oxygen (mg/L)**	% Saturation	Water Temp (degrees C)	pH***	E. coli (colonies/100 mL)	BOD5 (mg/L)	Ortho-phosphate (mg/L)****	Total Phosphate (mg/L)	Nitrate (NO3-mg/L)	Nitrite (NO2-mg/L)	Turbidity (NTU)
Sinking Creek 1 4/21/07	3	11	115	19	7.5	0	2	0	0	0	0	<15
Sinking Creek 1 Storm 5/16/07	3	5	55	18	6.5	0	4	0	0	0	0	<15
Sinking Creek 2 4/21/07	17	9	85	11	6	0	1	0	0	0	0	<15
Sinking Creek 2 Storm 5/16/07	6	7	70	18	6.5	0	0	0	0	0	0	<15
Sinking Creek 3 4/21/07	12	9	100	20	7.5	0	1	0	0	0	0	<15
Sinking Creek 3 Storm 5/16/07	4	5.5	55	16	6.5	0	2	0	0	0	0	<15
Sinking Creek 4 4/21/07	22	11	120	19	7.5	100	4	0	0	0	0	~17.5
Sinking Creek 4 Storm 5/16/07	12	7	70	16	7	0	1.5	0	0	0	0	~17.5
Sinking Creek 5 4/22/07	14	11	120	20	7	0	4	0	0	0	0	n/a
Sinking Creek 5 Storm 5/16/07	14	4.5	50	18	7	0	2	0	0	0.5	0	<15

<sup>2</sup> *PTI: Pollution Tolerance Index		Parameter	Dissolved Oxygen (mg/L)	pH	E. Coli (Colonies/ 100mL)
>23	Excellent	Typical Range:	5.4-14.2	7.2-8.8	133-1,157
17-22	Good	Indiana Average:	9.8	8.0	645
11-16	Fair	State Water Quality Standard:	Avg. > 5, not < 4	6.0-9.0	<235
<10	Poor				

Parameter	BOD <sub>5</sub> (mg/L)	Total Phosphate (mg/L)	Nitrate (mg/L)	Turbidity (NTU)
Typical Range:	0-6.3	0-0.85	0-36.08	0-173
Indiana Average:	1.5	0.05	12.32	36

\*\* Dissolved oxygen can be expressed as % saturation, which accounts for the effects of water temperature. Values closer to 100% saturation are considered ideal.

\*\*\* “Due to the state’s limestone geology, Indiana surface waters will typically have a pH that is relatively basic (> 7).”

\*\*\*\* “We generally expect orthophosphate values to be less than total phosphate, since orthophosphate is but one component of total phosphate.”

<sup>2</sup> Volunteer Stream Monitoring Training Manual, Hoosier Riverwatch. March 2004. Indiana Department of Natural Resources, Division of Fish and Wildlife. Available at: <http://www.in.gov/dnr/riverwatch/>.

## Erosion Data Summary

Sinking Creek	Process	Bank of Concern	Bank Length		Bank Height		Bank Angle		Top Width	Wetted Width
			Left	Right	Left	Right	Left	Right		
Sinking Creek 1 4/21/07	sediment deposition, bank failure	right bank, steep slopes		50		4		80	12.5	6.25
Sinking Creek 5 4/22/07	bank failure	both banks, meander bends	10	10	4	4	75	75	4	4

Sinking Creek	Land Ownership	Land Cover	Threat To Infrastructure	Riparian Width		Erosion Severity	Site Access
				Left	Right		
Sinking Creek 1 4/21/07	Private	Grass, parking lot	Yes (Blockbuster parking lot)	25-50 ft.	<25 ft.	2	5
Sinking Creek 5 4/22/07	Private	Forest	No	<25 ft.	25-50 ft.	2	2

## Impacted Buffer Data Summary

Sinking Creek	Impacted Bank	Reason	Land Ownership		Land Cover		Invasive Plants	Stream Shade	Wetlands	Restoration Candidate
			Left Bank	Right Bank	Left Bank	Right Bank				
Sinking Creek 1 4/21/07	Both	Inadequate lack of vegetation, too narrow	Private	Private	Turf Lawn	Shrub Scrub	None	Partial	no	natural regeneration
Sinking Creek 2 4/21/07	Both	too narrow	Private	Private	Turf Lawn	Pavement	None	Partial	no	
Sinking Creek 3 4/21/07	Right	too narrow adjacent agriculture	Private	Private	Trees Trees, Shrub Scrub	Trees Shrub Scrub, Trees	None	Partial	yes	natural regeneration
Sinking Creek 4 4/21/07	Both		Private	Private			None	Partial	yes	

# Miscellaneous Data Summary

Sinking Creek	Describe	Restoration
Sinking Creek 4 4/21/07	Dead fish in stream; brambles	

## Reach Level Assessment

Sinking Creek	Time	Latitude	Longitude	LandUse	Dominant Substrate Silt/Clay (fine or slick)	Water Clarity	Aquatic Plants		Wildlife Fish, Frog, Muskrat	Stream Shading	Channel Dynamics
							Attached	Floating			
Sinking Creek 1 4/21/07	11:00AM	39°09.825' N	86°34.779' W	Commercial	Silt/Clay (fine or slick)	Clear	some	none		Halfway (>50%)	sed. depositon, bank failure
Sinking Creek 2 4/21/07	2:00PM	39°09.451' N	86°34.968' W	Suburban Residential	Gravel (0.1-2.5 Silt/Clay (fine or slick)	Clear	some	some	Crayfish	Halfway (>50%)	downcutting
Sinking Creek 3 4/21/07	3:00PM	39°09.301' N	86°35.168' W	Suburban Residential	Silt/Clay (fine or slick)	Clear	some	some	Fish	Halfway (>50%) Mostly shaded (>75% coverage)	sed. Deposition
Sinking Creek 4 4/21/07	4:00PM	39°08.641' N	86°35.490' W	Forest, Crop	Silt/Clay (fine or slick)	Clear	some	none		Mostly shaded (>75% coverage)	unknown
Sinking Creek 5 4/22/07	1:37PM	39°08.241' N	86°35.626' W	Forest, Pasture	Silt/Clay (fine or slick)	Clear	some	none		Mostly shaded (>75% coverage)	downcutting, sed. Deposition

Sinking Creek	Site Access	In-Stream Habitat	Vegetative Protection		Erosion		Floodplain Connection	Floodplain Vegetation	Vegetated Buffer Width		Floodplain Habitat	Floodplain Encroachment
			Left Bank	Right Bank	Left Bank	Right Bank			Left Bank	Right Bank		
Sinking Creek 1 4/21/07	5	7	4	7	8	7	15	5	4	4	5	3
Sinking Creek 2 4/21/07	5	14	9	9	9	9	11	3	4	4	2	2
Sinking Creek 3 4/21/07	4	14	7	7	9	9	16	15	9	7	5	15
Sinking Creek 4 4/21/07	1	10	9	9	10	10	16	15	10	10	16	15
Sinking Creek 5 4/22/07	1	10	8	8	5	5	5	13	8	9	17	18

## Trash and Debris Data Summary

<b>Sinking Creek</b>	Type	Material	Source	Location	Amount of Trash (pick- up truck loads)	Land Ownership	Restoration	Clean-up equipment	Clean-up needs	Clean- up Potential
Sinking Creek 1 4/21/07	Commercial	plastic, paper, construction	local outfall	stream, both banks	1	private	stream cleanup	trash bags	volunteers, dumpster	5
Sinking Creek 2 4/21/07	Residential	plastic, automotive, paper, metal	local outfall	stream, both banks	1	private	stream cleanup	trash bags	volunteers	5
Sinking Creek 3 4/21/07	Residential	plastic, paper, metal	local outfall illegal	stream, both banks	1	private	stream cleanup	trash bags	volunteers	5
Sinking Creek 5 4/22/07	Residential	plastic, tires, paper	dumping, local outfall	stream, both banks	2	private	no	trash bags	volunteers	4

*bulk items would require more effort to remove*

## Utility Impacts Data Summary

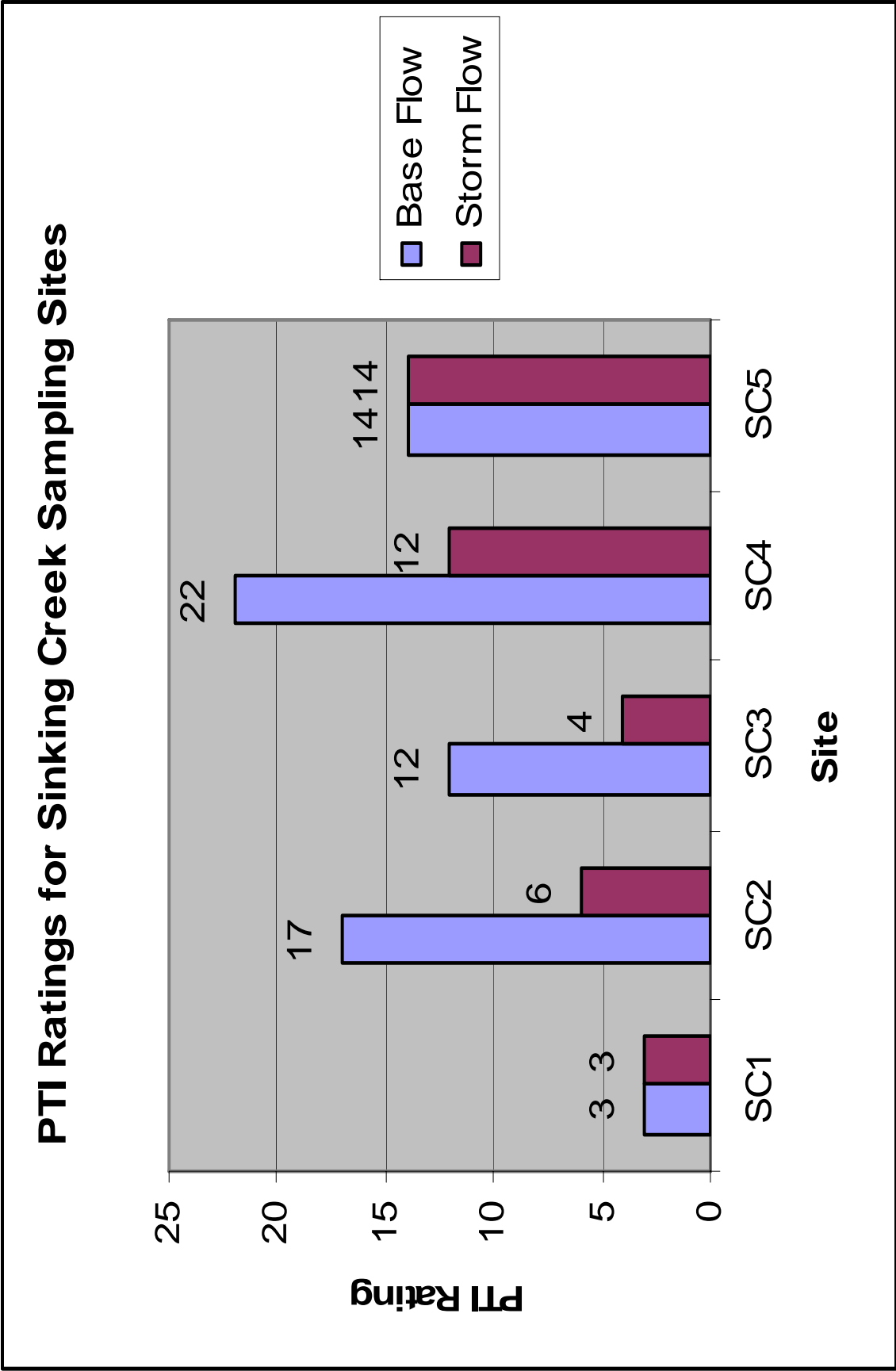
<b>Sinking Creek</b>	Utility Impact	Type	Material	Location	Fish Barrier	Diameter	Length Exposed	Condition	Discharge				Restoration	Water Drop
									Color	Odor	Deposits			
Sinking Creek 1 4/21/07	yes	exposed pipe	PVC	stream bottom	no	5 in.	10 ft.	joint failure	none	none	none	structural repairs	0	
Sinking Creek 2 4/21/07	yes	exposed pipe	corrugated metal	stream bottom	no	5 in.	5.5 ft.						0	

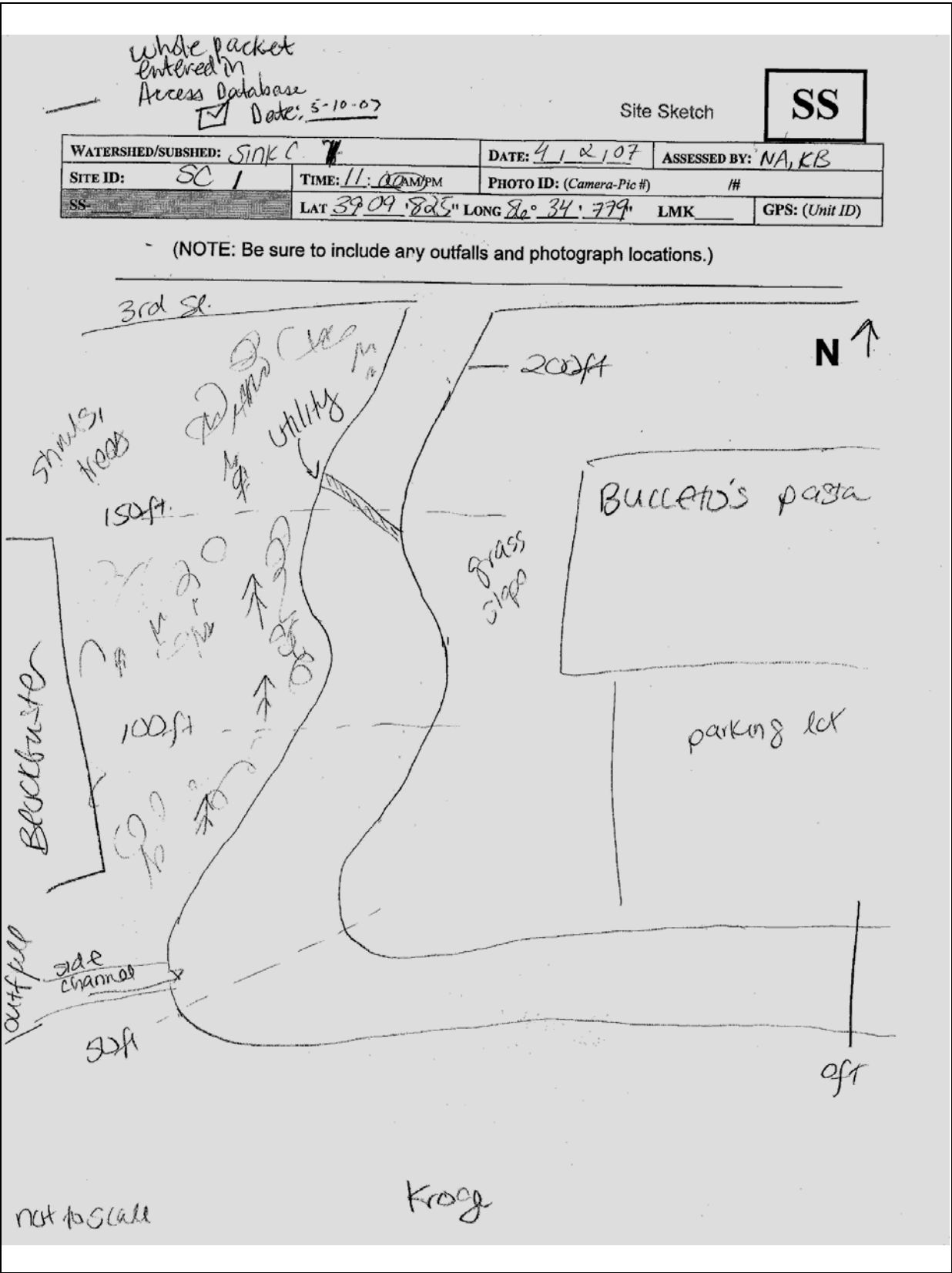
**Notes:** Restoration: pipe testing, dry weather sampling, fish barrier removal (12 in drop)

Appendix B – Sinking Creek

Macroinvertebrate species count – Sinking Creek

	SC1	SC1- S1	SC2	SC2-S1	SC3	SC3-S1	SC4	SC4-S1	SC5	SC5-S1
<b>Intolerant Species</b>										
Stonefly Nymph										
Mayfly Nymph										
Caddisfly Larvae							1			
Dobsonfly Larvae										
Riffle Beetle			1				1			
Water Penny										
Right-handed Snail				1	11				1	1
<b>Moderately Intolerant</b>										
Damselfly Larvae							5	4		1
Dragonfly Larvae			1							
Sowbug			1				75	40		
Scud							5	30	6	20
Cranefly Larvae			1		1				1	
Clams/Mussels										2
Crayfish							1	1		
<b>Fairly Tolerant</b>										
Midges	3	30	4	30	10	5	5		30	
Blackfly Larvae										
Planaria										
Leech										
<b>Very Tolerant</b>										
Left-handed Snail	2	4	5		4	3			5	4
Aquatic Worms			2		4					
Blood Midge					1	2			1	
Rat-tailed Maggot										







Site Sketch SS

whole packet entered in Access Database  Date: 5-14-07

WATERSHED/SUBSHED: SC By Kings	DATE: 9/16/07	ASSESSED BY: KB NA
SITE ID: SC3	TIME: : AM/PM	PHOTO ID: (Camera-Pic #) #
SS- _____	LAT 39° 09' 30" N	LONG 86° 35' 28" W LMK _____ GPS: (Unit ID)

(NOTE: Be sure to include any outfalls and photograph locations.)  
39.155017

↑ N

Not to scale

Gifford Road

house

20ft

15ft

10ft

5ft

cubert

off

whole packet entered in Access Database  Date: 5-14-07

Site Sketch SS

WATERSHED/SUBSHED: SC 4	DATE: 4/2/07	ASSESSED BY: KB, NA
SITE ID:	TIME: 3:10 AM (PM)	PHOTO ID: (Camera-Pic #) #
SS- _____	LAT ° ' " LONG ° ' " LMK _____	GPS: (Unit ID)

(NOTE: Be sure to include all photos and photograph locations.)

39 08 641      8035490

Whole packet entered in Access Database  Date: 05-14-07

Site Sketch SS

WATERSHED/SUBSHED: <i>sinking creek</i>		DATE: ___/___/___	ASSESSED BY:
SITE ID: <i>5</i>	TIME: ___:___ AM/PM	PHOTO ID: (Camera-Pic #) #	
SS-_____	LAT <i>39° 08' 24" N</i>	LONG <i>86° 35' 62" W</i>	LMK _____ GPS: (Unit ID)

(NOTE: Be sure to include any outfalls and photograph locations.)

200 ft

150 ft

50 ft

100 ft

N

stream disappears into sinkhole

Weather Reports for Sampling Days – East Fork Clear Creek

<b>Sampling Dates</b>
5/16/07 (storm)
4/21/07 & 4/22/07

Because full weather reports were not obtained on the sampling days, historical data was required and obtained from Weather Underground.<sup>3</sup> For additional sampling, full weather reports should be obtained on the actual sampling day from the National Weather Service, at <http://www.crh.noaa.gov/crh/>.

Storm Sampling Weekly Weather Summaries:

2006	Temperature (°F)			Dew Point (°F)			Humidity (%)			Sea Level Pressure (in)			Visibility (mi)			Wind (mph)		Gust Speed (mph)	Precipitation (in)	Events
	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	high	sum				
<a href="#">13</a>	73	62	48	48	39	33	71	43	23	30.28	30.22	30.13	10	10	10	13	11	-	0.00	
<a href="#">14</a>	82	64	44	49	42	39	86	50	24	30.19	30.15	30.04	10	10	10	9	0	-	0.00	
<a href="#">15</a>	87	74	62	64	54	44	83	60	35	30.04	29.94	29.83	10	9	2	24	9	33	0.18	Rain
<a href="#">16</a>	66	59	51	61	58	39	90	74	40	30.06	29.90	29.88	10	8	3	15	9	23	0.34	Rain
<a href="#">17</a>	62	54	45	45	43	37	82	62	44	30.28	30.14	30.01	10	10	10	17	8	22	0.00	
<a href="#">18</a>	55	44	39	40	38	36	89	80	53	30.33	30.29	30.28	10	10	10	6	3	-	0.00	

<sup>3</sup> Weather Underground. Monroe County Indiana, weather history for this location. Available at: <http://www.wunderground.com/forecasts/BMG.html>.

Base Flow Sampling Weekly Weather Summaries:

2006	Temperature (°F)			Dew Point (°F)			Humidity (%)			Sea Level Pressure (in)			Visibility (mi)			Wind (mph)		Gust Speed (mph)	Precipitation (in)	Events
	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	high	sum	
<a href="#">18</a>	64	55	43	44	41	37	71	58	42	29.88	29.77	29.72	10	10	10	17	3	23	0.00	
<a href="#">19</a>	57	47	37	40	36	35	86	70	53	30.12	29.98	29.86	10	9	7	15	7	-	0.00	
<a href="#">20</a>	72	53	34	42	34	32	93	61	26	30.25	30.19	30.13	10	8	2	10	2	-	0.00	
<a href="#">21</a>	77	58	39	44	39	34	82	54	22	30.27	30.21	30.11	10	10	10	8	0	-	0.00	
<a href="#">22</a>	81	66	48	49	42	39	77	46	28	30.16	30.07	29.98	10	10	10	21	5	28	0.00	
<a href="#">23</a>	81	72	62	59	50	42	78	49	36	30.02	29.98	29.94	10	10	9	22	14	32	0.06	